

Questions and answers about hydraulic fracturing in Michigan

What is fracking?

Fracking is a slang term for hydraulic fracturing, a process that maximizes the output of natural gas and oil wells to make them productive.

How does hydraulic fracturing work?

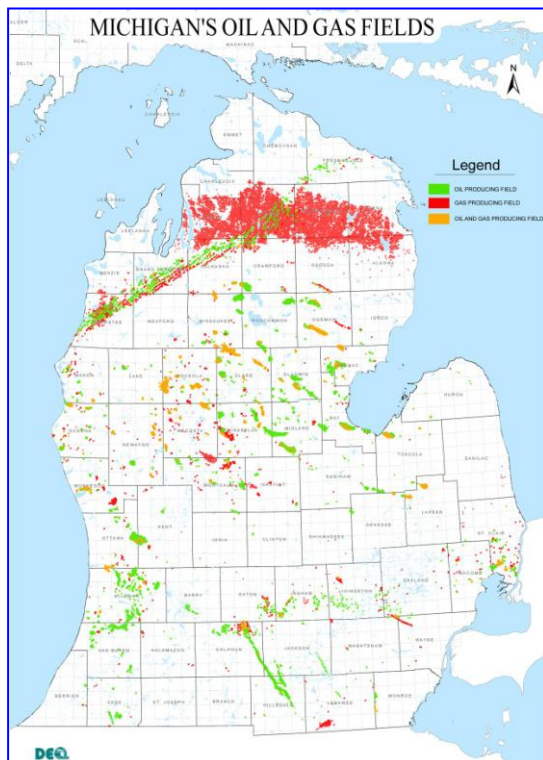
When a well is fractured, an operator pumps a mixture of water, sand and a small amount of chemical into an oil or gas formation deep underground and applies pressure. The pressure fractures rock layers, releasing oil or gas reserves. The sand holds the fractures open to continue allowing the oil or gas to flow into the well.

As gas or oil comes to the well head under pressure, it brings with it the fracturing water that was pumped, along with natural brines that are present in the deeper layers. That “flowback” water is separated from the gas and oil at the surface, contained in steel tanks and sent to deep injection wells for disposal.

Is hydraulic fracturing new?

No. Gas and oil operators have been using hydraulic fracturing around the country since the late 1940s.

Is hydraulic fracturing used in Michigan now?



Yes. Companies in Michigan have been using it to maximize oil and gas production for about 50 years. Approximately 12,000 wells have been fractured in that time, and fracturing has never jeopardized the environment or public health.

Has hydraulic fracturing been responsible for environmental damage in Michigan?

No.

Some are calling for a halt on fracking so it can be studied. What does DEQ think?

State regulators have been studying hydraulic fracturing in action for five decades. As the lead regulatory agency in Michigan, the DEQ

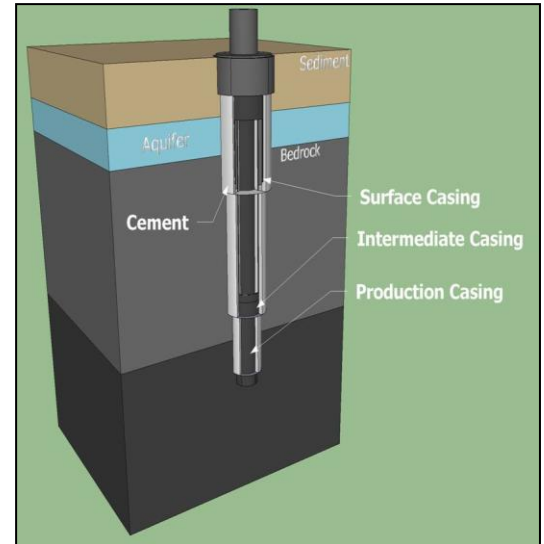
does not support halting an activity that has been regularly used without serious incident.

What makes Michigan different from other states?

Michigan has strict rules about how much water can be used for fracturing, how wells are built, how they are tested before they are employed, and how the used 'flowback' water is contained and disposed of. These are the four top risks from gas and oil development. The DEQ has developed a regulatory structure that has effectively protected Michigan's environment and public health for decades.

Does the DEQ *support* hydraulic fracturing?

The Michigan Department of Environmental Quality exists to protect the environment and public health by regulating industrial activity that impacts Michigan's air, water and soil.



The DEQ regulates gas and oil production in Michigan.

Hydraulic fracturing is a common technique that has been used on more than 12,000 wells in Michigan for more than 50 years without any consequence to the environment or public health.

If this process posed a threat to the public or the environment, the DEQ would further regulate it or outlaw it. To the contrary, Michigan's regulatory structure has been held up as a national model for effective, protective regulation.

Is hydraulic fracturing necessary?

Hydraulic fracturing has been used on 78% of all wells drilled in recent years in Michigan for a simple reason: it works. Traditional gas and oil development involved drilling into rock formations that allowed oil and gas to flow freely through the rock and into a well bore.

Hydraulic fracturing technology allows for development of "tight" rock formations that contain oil or gas but do not allow it to flow into a well without this technology. Hydraulic fracturing has dramatically increased the production of oil and gas in the United States and reduced the need for imported energy supplies.

Does the DEQ support further regulating or stopping hydraulic fracturing?

The DEQ regularly updates its regulations to reflect changes in the environment, available technology or to industry. The hydraulic fracturing regulations were updated in 2011.

The environmental and public health issues in other states have never happened here because the DEQ monitors gas and oil production in Michigan very carefully. The DEQ is confident in its ability to protect the public and allow the gas and oil industry to continue developing local energy.

What kinds of chemicals are used?

Many people are surprised to learn that 99.5% of ‘fracking fluid’ is water and sand. The remaining half percent varies, but the chemicals used are determined by the type of rock targeted for production. Below is a breakdown of common fracturing fluid components.

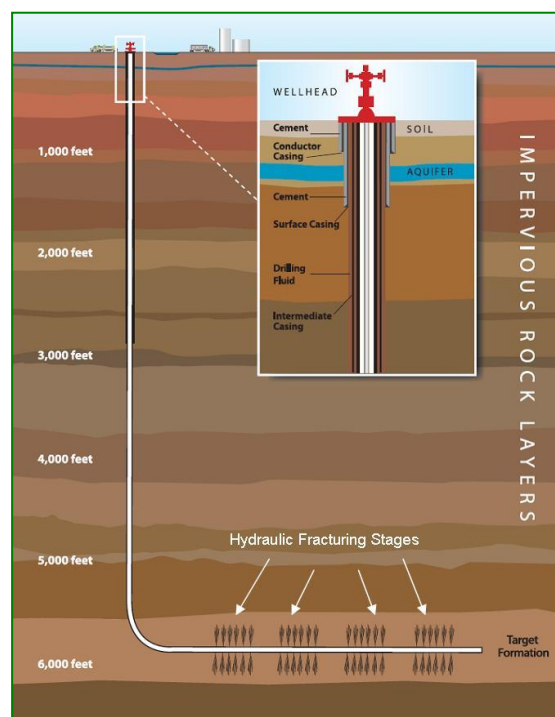
Component / Additive Type	Example Compound(s)	Purpose	Percent Composition (by volume)
Water		deliver proppant	90
Proppant	Silica, quartz sand	keep fractures open to allow gas flow out	9.51
Acid	Hydrochloric Acid	dissolve minerals initiate cracks in the rock	0.1230
Friction Reducer	Polyacrylamide, mineral oil	Minimize friction between fluid and the pipe	0.0880
Surfactant	isopropanol	Increase the viscosity of the fluid	0.0850
Potassium chloride		create a brine carrier fluid	0.0600
Gelling agent	guar gum, hydroxyethyl, cellulose	Thicken the fluid to suspend the proppant	0.0560
Scale inhibitor	Ethylene glycol	prevent scale deposits	0.0430
pH adjusting agent	Sodium or potassium carbonate	Maintain the effectiveness of the other components	0.0110
Breaker	Ammonium persulfate	allowed delayed breakdown of the gel	0.0100
Crosslinker	Borate salts	maintain fluid viscosity as temperature increase	0.0070
Iron Control	Citric Acid	prevent precipitation of metal oxides	0.0040
Corrosion Inhibitor	N, N-dimethyl formamide	prevent pipe corrosion	0.0020
Biocide	Glutaraldehyde	eliminate bacteria	0.0010

I’ve heard “horizontal” fracturing is different. Is it?

In past years, most natural gas exploration in Michigan targeted reserves ranging up to 2,000 feet below the surface. Energy companies more recently have started to target deposits that are 5,000 or more feet underground.

The process for fracturing the wells remains the same. What is different is the amount of oil or gas recovered and the amount of water required for hydraulic fracturing and the increasing use of horizontal drilling.

Horizontal drilling means operators can get up to 15 times the amount of gas per wellhead, reducing their footprint on the landscape with fewer wells. These deposits are even further from the surface, which further reduces any potential threat to aquifers. However, it uses more water than a shallow, vertical well operation.



Four myths about hydraulic fracturing:

I've heard that hydraulic fracturing causes earthquakes.

Not True. However, there have been some instances where deep wells used for disposal of waste fluids from gas and oil development were associated with small earthquakes under specific conditions. Michigan does not have the conditions necessary for this to occur.

I saw a video where someone lit their tapwater on fire. Is that from hydraulic fracturing?

No. There have been a few rare cases where gas from drilling operations has escaped into fresh water aquifers; however, that was caused by improper well construction, *not* hydraulic fracturing. Where gas occurs in water wells, it is almost always from natural pockets of methane gas. Over time, gas seeps into the water well and is transmitted into the home. It has been documented in Michigan public health advisories dating back to the 1960s. It has never been associated with hydraulic fracturing.

I read that hydraulic fracturing in other states has polluted rivers.

True. Operators in Pennsylvania were disposing of used flowback water at local wastewater treatment plants, which were not equipped to remove chemicals and naturally occurring salts from the water.

This has never happened in Michigan because Michigan regulations require flowback water to be secured in steel tanks and sent to deep injection wells for disposal. Operators are not allowed to use any other containment or disposal method.

I heard that horizontal fracking is a threat to water supplies.

Not true. When anyone – whether it is a soft drink bottling plant, an industrial company or a municipal water supplier – proposes to use a large amount of water, that proposal is entered into a computer program Michigan regulators designed to track and measure water use and protect local aquifers.

If it appears that proposed local uses put dangerous stress on local water supplies, the proposed withdrawal request is denied.

Michigan's water withdrawal assessment tool is a nationally lauded environmental protection technique. Learn more about it at

www.miwwat.org/